

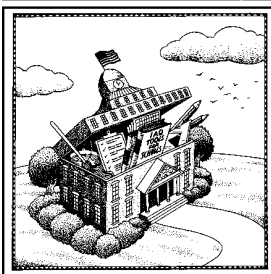


# CASE STUDY

## ROBERT K. SHAFER MIDDLE SCHOOL

*Bensalem Township School District, Bensalem, Pennsylvania*

### Indoor Air Quality



### Tools for Schools

Decision makers in the Bensalem School District wanted to evaluate the strengths and weaknesses of the *Indoor Air Quality Tools for Schools (IAQ TFS)* Kit for different school types: an older school (Belmont Hills Elementary School), a recently renovated school (Robert K. Shafer Middle School), and a new school (Cornwells Elementary School). This case study focuses on Shafer Middle School.

Shafer has had a long history of indoor air quality (IAQ) complaints by staff. Reports of ventilation problems and odors led to suspected adverse health problems for some and eventually resulted in legal action. The teachers contacted the National Institute of Occupational Safety and Health (NIOSH) to evaluate and investigate these suspected problems. NIOSH, part of the Centers for Disease Control and Prevention (CDC), is responsible for conducting research and making recommendations for the prevention of work-related disease and injury. Although the District took immediate corrective action on

the items identified by NIOSH, IAQ complaints were still an ongoing issue at Shafer Middle School. Hoping to find answers to their IAQ problems, Bensalem Township School District elected to join an *Indoor Air Quality Tools for Schools* pilot program with the help of EPA Region 3 in September 1998.

***“The IAQ TFS Program opened our eyes to the many valuable resources that were available to us.”***

*-Tom Vasek, District  
IAQ Coordinator*

## Approach—Project Description

### School Description

Shafer Middle School was built in the late 1970's during a time of high inflation and energy prices, so energy efficiency was a prominent consideration in its design and construction. The school was built on a 32-acre site in close proximity to two other schools. The architecture features a ceramic brick and flat-roofed exterior, dropped ceilings, and cinder block walls. There is no basement or crawl space in the school. The school measures 126,260 square feet and is serviced by water source heat pumps. Shafer recently underwent a \$4.5 million renovation in 1998-1999 that included substantial upgrades to the roof, lighting, and heating, ventilation and air conditioning (HVAC) system. Approximately 560 students are taught in 40 classrooms.

### IAQ Team

EPA Region 3 trained Tom Vasek, Bensalem's IAQ Coordinator and staff member in charge of school environmental affairs, and other district staff on the *IAQ TFS* Program. Shafer's IAQ Team consisted of Mr. Vasek, EPA regional staff, school district officials, the school principal, several teachers, the school nurse, and school support staff. Two of the contractors that were servicing the school, the HVAC contractor and the pest control contractor, also joined the team and made their representatives available to answer questions from team members and teachers. Parents are expected to join the team in the future.

### Problem Identification

The IAQ Team conducted two walkthroughs of the school and performed a comprehensive survey of the building structure and equipment. The initial walkthroughs identified numerous IAQ problems, some of which were repaired on the spot while others involved additional cost and complexity. The latter issues were addressed with special School Board approval. Following the second walkthrough, EPA tested humidity, noise, and radon levels in the school.

Teachers completed the *IAQ TFS* Kit checklists in October and November of 1998. These surveys revealed that nearly half of the school's rooms required follow-up action to alleviate the following issues:

- Health complaints, including severe respiratory infections; respiratory irritations (sneezing, coughs, throat irritation, and sinusitis); irritation of the eyes and skin; and headaches.

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***“The IAQ TFS Program fostered communication not only between teachers and custodians but with the contractors as well. The Program allowed us to become part of the school.”***

*-Barry Barnes, Service Technician and IAQ Team member*

- Thermal discomfort (some parts of the school were too warm while others were too cold), including fluctuating temperatures.
- Ventilation problems, including infiltration of fumes from a bus platform, poor air circulation, and inoperative or missing exhaust fans in science rooms, computer rooms, and a pool chemical storage area.
- Cleanliness problems, including insects, dirty floors, and dusty furniture.

Bensalem closely adhered to the steps and recommendations of the Kit while conducting its IAQ effort. Teachers completed the checklists four times each year and the IAQ Team mapped the results by floor and room number to track conditions in each room. Use of the Kit also fostered increased communication between staff, IAQ Team members, and the two contractors working closely with the school.

### **Lessons Learned**

#### ***Short-Term Solutions***

The *IAQ TFS* Program led to wholesale improvements in indoor air quality at Shafer School. Many of the IAQ complaints noted early in the process were readily addressed. For example, fresh air intake has been improved and currently meets or exceeds standards. The *IAQ TFS* Kit also assisted the Team in identifying and amending problems with chlorine odors in the pool vicinity.

Today, the IAQ Team has implemented the nineteen steps of the Kit's Indoor Air Quality Management Plan. Initially, the Team closely followed the IAQ Coordinator's Guide, but they later adapted the work to their specific needs and concerns. The IAQ Team also designed an emergency plan to address situations such as a chemical spill or HVAC shutdown.

Among the many dramatic changes, according to officials, was the before and after difference that the *IAQ TFS* Program made in the management of the school environment. Before enrolling in the pilot program, staff meetings were often marked by unresolved frustration over classroom environmental problems. Once the program was in place, the staff was able to effectively and efficiently develop solutions to IAQ issues. The *IAQ TFS* Kit also played a defining role in helping the teachers learn more about IAQ issues and the effect they have on their health and their students' health.

#### ***Long-Term Practices and Policies***

The school is currently measuring the success of their IAQ effort using the school nurse's database and surveys of the perceptions of staff and students. The IAQ Team plans to take the results to the School Board so that IAQ efforts in the remaining schools in the District can begin *postea haste*. Since the pilot program began in 1998, the District implemented the *IAQ TFS* Program in two schools in 1999 and in another school in 2000.

According to school officials, the IAQ Coordinator was the lynchpin for the entire effort. Mr. Vasek's dedication and successful history with the District were essential in gaining buy-in and respect from the School Board. The entire IAQ Team worked together to improve the quality of the learning environment throughout the school. The Team noted that the *IAQ TFS* Program allowed them to identify the resources that were available to them and how to effectively use these resources to combat IAQ problems throughout the district. Bensalem School Township District was among the first schools to be awarded the National *Indoor Air Quality Tools for Schools* Excellence Award in 2000. The IAQ Team has also publicized its successes with a public event that included a speeches by the mayor, state and Congressional representatives, and award presentations.

#### ***For more information, contact***

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